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PATENT

Attorney Reference Number 2151-49023



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Dubelsten et al.

Art Unit: 1755

Application No. 08/988,680

Filed: December 11, 1997

For: APPARATUS AND METHOD FOR CONTINUOUS FORMATION OF COMPOSITES HAVING FILLER AND THERMOACTIVE MATERIALS AND PRODUCTS MADE BY THE METHOD

Examiner: David Brunsman

Date: October 2, 2000

CERTIFICATE OF FACSIMILE

I hereby certify that this correspondence and any documents referred to as being attached are being facsimile to the Patent and Trademark Office via 703/305-3599 on October 19, 2000.

Stacey C. Slater, Esq.
Attorney for Applicant

**DECLARATION OF STANLEY B. SCHROEDER UNDER 37 C.F.R. § 1.132**

TO THE COMMISSIONER FOR PATENTS
Washington, DC 20231

I, Stanley B. Schroeder, declare as follows:

1. I currently am an employee of Lilly Industries, Inc. (Lilly). I have been employed by Lilly since May of 1993. My experience in the field includes over thirty years coating development work. A copy of my current resume is attached hereto as Exhibit A.

2. I have been asked by Boise Cascade to test wood-plastic composites as described in the patent application referenced above to determine the ability of such products to receive and to adhere to materials, such as paints. I believe that the commercial success of the Boise Cascade product will, in large part, depend upon the success of their surface treatment in making possible a durable, weather resistant, well adhered, primer coating on a surface comprising polyethylene, particularly surfaces which are 100% polyethylene.

3. Lilly has had significant experience with trying to coat or paint polyolefins, such as polyethylene. Lilly's experience with coatings on untreated polyethylene has been very discouraging. Persons of ordinary skill in the art have believed that certain mechanical treatments, such as abrading or sanding the surface of the composite to expose cellulosic material, is sufficient to provide adequate bonding between the composite product and the coating. However, Lilly's experience has shown that, even with sanding or other mechanical abrasion techniques, adhesion of coatings to untreated polyethylene has been

extremely poor.

4. Lilly may be asked to provide primer useful for painting Boise Cascade's composite products. However, prior to Lilly providing primer for an exterior-exposed, polyolefin product, such as the wood-plastic product embodiments described in the application referenced above, Lilly desired to perform a series of weather resistance tests on surface-treated versus non-surface-treated boards. In summary, all these tests have proven the durability of the primer/composite bond that is achieved using the proprietary surface treatment of Boise Cascade. To my knowledge, this is the first example of a product which provides significant adhesion in the primer-composite bond.

5. A number of tests were performed by Lilly on a 7/16" board product made as described in the referenced application. First, an accelerated weathered adhesion test was performed on coated composites after accelerated weathering exposure. Paint adhesion to the composite product provided by Boise Cascade was measured using the Method B Tape Test according to ASTM D3359, entitled The Standard Test Method for Measuring Adhesion by Tape Test. Briefly, this test procedure involved (a) scribing through the paint film in a crosshatched pattern, (b) applying 3M Scotch 250 tape, the building products' industry standard, to the painted board, (c) pulling off the tape, and (d) rating the results as described in ASTM D3359. The data obtained by this accelerated weather test are summarized below in Table 1.

| TEST | ASTM D3359, METHOD B TAPE TEST |
|---|---|
| 1. Atlas twin weatherometer 1047 hours<br>-acrylic sealer/primer<br>-acrylic sealer/primer + Sherwin Williams A100 paint | <br>5<br>5 |
| 2. ASTM D5722, 150 $Mj/m^2$<br>- acrylic sealer/primer | <br>5 |
| 3. 7 months, 45° exposure, facing south in High Point N.C. 2 water-born acrylic primers, 1 and 2 coats with and without Sherwin Williams A100 paint | 5 |

**Table 1**

6. Additional tests also were conducted. In all such cases, a state of the art coating made with an adhesion-promoted acrylic latex was used. This coating was capable of wetting the low energy, untreated polyethylene surface well enough to flow and cover without crawling or other defects. But,

without surface-modifying products as described by Boise Cascade in the application referenced above, sufficient adhesion for a weather-resistant product was not achieved. These results are summarized below in Table 2.

| TEST CONDITIONS | ASTM D3359 | |
|---|---|---|
| | Untreated Surface | Treated Surface |
| 1. Primer applied to cold board and dried 5 minutes/120°F – warm from oven. | 0 | 5 |
| 2. Primer applied to cold board and dried 5 minutes/120°F - cooled to room temperature. | 0 | 5 |
| 3. Primer applied to cold board, dried 5 minutes/120°F and immersed in water for 1 hour, dried and allowed to recover for 16 hours. | 0 | 5 |

**Table 2**

These data clearly show that non-surface-modified boards performed poorly. In fact, although the ASTM scale defines 0 adhesion as 65% removal of the paint by the tape, the 0 ratings recorded in Table 2, and in Table 3 below, actually represent 100% removal, i.e., complete failure of the paint layer to adhere to the composite product.

7. The results presented in paragraph 6 clearly show that non-surface-modified control products did not perform well. In an effort to obtain better results with the nonsurface-modified products, the surface of a Boise-Cascade provided board was sanded. The composite control and test product also were preheated to 120°F. These test results are presented below.

| TEST CONDITIONS | ASTM D3359 Adhesion Rating | | |
|---|---|---|---|
| | Treated | Untreated | Untreated and Sanded |
| 1. Primer applied to 120°F preheated board and dried 5 minutes/120°F – product tested warm from oven. | 5 | 0 | 0 |
| 2. Primer applied to 120°F preheated board and dried 5 minutes/120°F – product cooled to room temperature. | 5 | 0 | 0 |

**Table 2**

8. Ratings of 4 or 5 are required for a weather-resistant product. Based on the data presented above, I conclude that the untreated polyethylene surface is not suitable for use as an exterior exposed product. Such products cannot be painted to protect them from exposure, such as protection from

degradation by UV exposure. The surface-modified products described in the application referenced above provide excellent adhesion, both initially and after exposure to weather.

9. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: Oct. 9, 2000

Stanley B. Schroeder

# Resume of Stanley B. Schroeder

| | |
|---|---|
| **1999 -** | Technical Project Manager, Lilly Industries, Seattle, WA with responsibility for development of new products in the Building Material Coating area. |
| **1997-1999 -** | Technical Manager, Lilly Industries with responsibility for management of the technical service and product development laboratory at the Seattle, WA plant. |
| **1995-1997 -** | Building Products S.B.U. Technical Manager, Lilly Industries, High Point, NC with global responsibility for development of building product coatings. |
| **1993-1995 -** | Technical Director, Lilly Industries, with responsibility for management of the technical service and product development laboratory at the Indianapolis, IN plant. |
| **1985-1993 -** | Technical Manager, Building Products Coatings, the Glidden Co., Strongville, OH. |
| **1970-1985 -** | Chemist and Technical Manager, Coating Development, Boise Cascade Inc., International Falls, MN. (Hardboard Siding Coatings). |
| **1968-1969 -** | Product Development Chemist, duPont, Wilmington, DE. (Fluorocarbon Products). |
| **1963-1967 -** | Process Development Chemist, duPont Montague, MI Neoprene Plant. |
| **1959-1963 -** | B.S. Chemistry, Michigan Tech., Houghton, MI.<br>Valedictorian, Shelby High School, Shelby, MI. |

Presently chairman ASTM D01.52, Factory Coated Wood Products.